AMERICAN VETERINARY REVIEW,

JANUARY, 1894.

EDITORIAL.

VETERINARY SOCIETIES.—We have on many occasions called the attention of our brethren in the profession to the importance and value of the principle of organization, and to the benefits which would necessarily result from well directed associated effort by the members of the veterinary profession. These may be easily assured to every individual practitioner who desires the formation of such associations in his district, and especially if he shall prove to be not only a nominal member, but an active worker of the organization.

The success which has attended the operations of such organizations as the Pennsylvania, the New York, the Illinois, and other State associations, conclusively shows that our expectations were not extravagant, and a mere glance at the strength of the United States Veterinary Medical Association, and the important position which it is called to fill, with the work which it has already accomplished in the veterinary field, ought to stimulate the members of the profession at large to the accomplishment of more work, and still greater results, by operating in the same direction.

It cannot be that our colleagues are blind to these facts. Evidently not, for it is but recently that our fellow practitioners of German origin and graduation have not only organized a German association, but have even decided to publish a monthly review in their own language. And the few regular members who are practicing in Virginia have organ-

ized themselves into a State association. And now, one of the oldest practitioners of metropolitan New York asks for such a local organization as the great city is undoubtedly entitled to, if not for other reasons, at least in consideration of the large number of veterinarians practicing within its boundaries.

Dr. L. McLean writes us as follows:

BROOKLYN, N. Y., November 22d, 1893.

Dr. A. Liautard, Editor of the American Veterinary Review:

DEAR SIR.—It seems a lamentable condition of affairs that in such large cities as New York and Brooklyn there is no form of organization among veterinarians. When we consider the benefits derived by the members from societies in other cities, as well as from State and national societies, we certainly must conclude that the veterinarians in and about New York and Brooklyn are decided losers in having no organization for their protection and the advancement of the science.

I would suggest that a society be formed of the New York and Brooklyn veterinarians; by this means we can protect ourselves from infringements upon our legal rights as a profession, and in no other way can we acquire the strength and recognition that would be derived from such union. I trust that this letter will arouse some one to take the necessary steps to form such an organization.

Yours truly,

L. MCLEAN, M.R.C.V.S.

Yes, Dr. McLean, you are right. There should be a society composed of the veterinarians of the cities of New York and Brooklyn, and we are gratified that the suggestion and the recommendation have come from you. A New York State Veterinary Medical Society was started in 1875, but died in a few years under circumstances which it is unnecessary to recall, though still its existence has not been wholly without result, and it has been resuscitated, as it were, by others, though under a similar name. But this need not prevent the formation of an organization in this city and Brooklyn; let us have it.

The New York State Veterinary Medical Society, as we have said, is the representative of the profession in the State, and has already done good work. It was well represented at the Chicago meeting. It is with pleasure, therefore, that we publish the invitation which Secretary N. P. Hinkley requests us do, though at so late a date:

NOTICE TO THE VETERINARIANS OF THE STATE OF NEW YORK.

The New York State Veterinary Medical Society will hold its fourth annual meeting in the assembly room of the Vanderbilt House, Syracuse, N. Y., on Tuesday and Wednesday, January 9th and 10th, 1894, commencing at 11 A.M. January 9th.

This meeting will be the last one to be held in the month of January, as according to the revised by-laws adopted by the Society at the last meeting, held in Buffalo, October 11th-12th, 1893, the Society will hereafter hold its meetings during the month of September of each year, the place of holding said meeting to be decided by a vote of a majority of the members present at the close of the annual meeting.

The January meeting will be an interesting one to all veterinarians. There will be several papers read and discussed, and the business portion of the meeting, consisting of the election of officers, reports of secretaries, treasurer and committees, and auditing of accounts will be made as short as possible, for the purpose of giving more time to the reading and discussing of the papers. The names of the authors of the papers with their subjects will be announced in the December number of the REVIEW. Veterinarians desiring to apply for membership should address the secretary at once. Printed notices will be mailed to all veterinarians.

Respectfully,

N. P. HINKLEY, D.V.S, *Secretary*.
395 Ellicott St., Buffalo, N. Y.

ECHOES OF THE UNITED STATES VETERINARY MEDICAL ASSOCIATION.—One of the best papers read at the First Veterinary Congress of America will be found in the present number of the REVIEW. Minute in its details, though not unnecessarily so, correct in its anatomical descriptions, precise in its description of the symptoms, and generous on the question of indication for treatment, Dr. Reynolds' paper is entitled to a degree of consideration quite beyond what it has obtained.

Of course it was listened to—at least we believe so—and could hardly have been read without eliciting a long and serious discussion. But is this all it deserved? We know not how this is, but we do consider the paper to be entitled to a better appreciation than it has met with.

Why should it not have been presented in competition for the prize offered by the Association? And further, on this point, what about the report of the Committee on Prizes? Was there any made, or was the worthy chairman of that important committee equally disabled as to this, as he was in

respect to other work on other committees? The prizes were certainly worth competing for, and they were sufficiently brought to the consideration of our friends, and it is at least a remarkable fact that not one application should have been made for any of them.

We have no doubt that the offer of prizes made by the Association still stands good, and we certainly desire it; would be pleased to be allowed to contribute toward such prizes as were offered previous to the Chicago meeting.

Among the reports offered at the Congress was the following, presented by the Committee on Finance:

Gentlemen:—Your Committee on Finance would respectfully report that they have examined the accounts of the Secretary and Treasurer, and find the same correct.

We would further submit that the books, papers, vouchers, etc., of the Secretary have been kept in such manner, and the work of his office has been performed in such able and efficient manner that they are worthy of especial notice, and said officer is deserving of the thanks of this Association for the able and careful attention he has always given to the duties of his office. To him more than to any one member of this Association are we at this time indebted for the wonderful success that has attended our efforts to advance the interest in this Association, and to place it in the position which it to-day occupies in the history of veterinary science in this country.

Respectfully submitted,

C. C. LYFORD,
WM. DOUGHERTY, } *Committee.*
W. B. E. MILLER,

It is unnecessary to say that this recommendation was unanimously voted, and we are pleased to see that the Secretary was rewarded for his efforts by being called to another office far more important, and involving a very different kind of attention and care in the fufilment of its duties, in being promoted from the secretaryship to the presidency, a post of more honor, but also of more serious labor and greater responsibility, with less thanks or other returns. And yet he will doubtless administer his new office quite as ably and satisfactorily as he has done that which he has vacated.

The publication of the papers now in our hands as read at the meeting will be completed in our next issue, together with our last installment of the "echoes."

ORIGINAL ARTICLES.

FISTULA.

By Prof. M. H. Reynolds, M.D.V.M., University of Minnesota.

Read before the United States Veterinary Medical Association, and International Veterinary Congress, Chicago, Oct. 18th, 1893.

There are few questions in the whole field of veterinary science of which the young practitioner feels that he knows more—and the older wishes he did know more—than those of fistula. Aside from castrations, there is probably no one class of patients with which rural practitioners deal more commonly, and none are more disagreeable or more unsatisfactory. We discuss them at every meeting of our State Association, so do our sister associations, and yet we use about the same old treatment as did our predecessors half a century ago. They are just as dirty and just as disagreeable, just as slow and just as liable to recur.

A thorough discussion of the anatomy concerned in the question of fistula of the cervical and anterior dorsal regions calls for a study of thirty-two pairs of muscles, nineteen pairs of nerves, one ligament and twenty pairs of arteries and their associated veins; but only the more important can be discussed in a paper of this length.

The muscles are counted as follows: Paniculus carnosus, one; all the superior cervical, numbering seventeen; all of the inferior cervical, numbering eleven; supra and infra spinatus of the external scapular, and one internal scapular, the subscapularis; four from the dorsal region, trapezius, small anterior serratus, ilio-spinalis and common intercostal. In the costal region, we will count about four of the external intercostals. In ordinary practice, however, we rarely find but seventeen pairs of muscles in the entire body associated with this pathological condition.

For brevity's sake, the blood and nerve supply is given with the myology. An operator who cares to become an expert in the treatment of these cases must know where

those muscles are, their origin, insertion, direction of fibres and their function. He must have definite ideas of the location, course and distribution of the larger blood vessels and nerves if he would make very deep incisions and punctures, as he sometimes must do. It is very unpleasant to cut the dorsal, superior cervical or even larger branches of the vertebral, under several inches of muscular tissue.

The paniculus is a broad sheet of muscular and aponeurotic tissue, somewhat triangular in shape, just under the skin and applied to the sides of thorax and abdomen. The subcutaneous thoracic, a branch from the brachial plexus, with superficial branches of the cervico- and dorso-spinal nerves, furnish nerve force. Its blood comes through the dorsal, vertebral, external thoracic and superior scapular, with all the dorsæ-spinal intercostals.

The cervical ligament, through its surgical importance demands more than passing notice. All the superior cervical muscles are arranged in layers beneath the funicular and on either side of the lamellar portion. The peculiar anatomical features of this great ligament and its association with related muscles, explain, in part, the prevalence and persistence of fistulæ in the cervical region. It is easily divided for study into two portions, the funicular and lamellar. The former is simply a wide band of yellow elastic fibres with one end inserted in the spinous process of the first dorsal vertebræ with the dorso-lumbar ligament; the other at the cervical tuberosity of the occipital bone. Its function is to support the head. The lamellar consists of two equal plates of similar tissue closely applied, placed vertically in the median line and filling the triangular space between the funicular portion and the cervical vertebræ. It is attached below to the spinous processes of last six cervical, to second and third dorsal vertebræ, and above to the funicular. They are in relation externally to one branch of the ilio-spinal ligament, the transverse-spinous muscle of the neck and great complexus. The superior cervical muscles, seventeen in number on each side, are arranged in four fairly well defined layers.

The trapezius is a thin, triangular muscle, covering the

withers and cervical base, attached above to the funicular ligament and transverse processes of the anterior dorsal vertebræ, and below by its apical aponeurosis to the acromion, spine and scapular aponeurosis. This muscle is covered by two aponeurotic plates, whose fibres run in opposite directions, and it, in turn, covers portions of the rhomboideus, splenius, angularis, supra and infra spinatus. Its blood comes mainly from the dorsal artery, and its nerve force from the spinal accessory. Fibres of the cervical portion run downward and backward.

The rhomboideus has the form of a long triangle-apex forward. It is covered by the cervical trapezius, scapular cartilage, and aponeurosis of the great dorsal. It covers the postero-superior, excavated portion of the splenius, whose fibres it crosses at an acute angle, in running backward and slightly downward. Its origin is on the posterior two-thirds of the cervical ligament and by fasciculi to the superior spinous processes of the second, third, fourth and fifth dorsal vertebræ. Its insertion is by the lower extremity to superior and internal surface of scapular cartilage. Its blood supply is from the dorsal and superior cervical; nerve supply is sixth cervical and muscular branch of the brachial plexus. The anterior fibres run nearly backward and the posterior downward.

Levator anguli scapulæ.—Short, powerful, triangular. Thick posterior and inferior borders, thin above, and placed just in front of scapula. Its origin is on the transverse processes of third, fourth, fifth, sixth and seventh cervical vertebræ by five fasciculi, whose fibres converge to a common tendon which inserts on the anterior triangular surface, internal face of scapula. Externally, in relation with cervical trapezius, mastoido-humeralis and the small pectoral, and internally with the splenius, ilio-spinalis and common intercostal. Its fibres all run downward and forward. Blood supply, dorsal and superior cervical; nerves, sixth cervical and muscular branch of the brachial plexus.

The *splenius* is one of the larger muscles of this region. Flattened, triangular, bounded above by the cervical cord,

below by the first four cervical vertebræ and inferior branch of the ilio-spinalis, attached by its postero-superior border to the cervical cord and spinous processes of the anterior dorsal vertebræ, by its anterior-inferior border, to mastoid crest and transverse processes of first five cervical vertebræ except the axis. Externally this muscle is in contact with rhomboideus, angularis, trapezius and mastoido-humeral. Internally, with both complexus muscles and the great and small oblique muscles of the head. Its fibres run parallel with the cervical cord. Its nutrition comes through the dorsal, superior cervical and vertebral arteries. Interesting features of this blood supply are the several anastomoses which the vertebral makes in this region, with the retrograde branch of the occipital muscular, and the middle spinal arteries. The anastomoses are essentially responsible for the persistent hemorrhages which we sometimes get when making incisions in the poll-evil region. The splenius receives nerve supply through both the superficial and deep cervical plexi.

Great complexus, a very large, strong muscle, placed between the splenius and lamellar portion of the cervical ligament. It consists of two fairly distinct portions, which lie side by side, and together form an elongated triangle. It covers the cervical ligament, the superior portion of the ilio-spinalis, the transverse spinous of the neck, the oblique and post straight muscles of the head, and it in turn is covered by the splenius and small complexus. The anterior portion has, for origin, the transverse processes of first and second dorsal and the articular tubercles of the cervical vertebræ. The posterior portion has its origin on the spinous processes of first four dorsal vertebræ. Both portions insert on the occiptal tuberosity and between them passes the trunk of the superior cervical artery. Fibres of the posterior and larger portion run forward and upward nearly parallel with the cervical cord. Those of the anterior portion have a direction more nearly upward and thus fuse with those of the posterior. Blood supply, dorsal, superior cervical and branches from the deep cervical plexus.

The *small complexus* is also composed of two distinct por-

tions, between which deep-seated collections of pus can burrow, and be almost out of surgical reach ; unlike many of the cervical muscles, it is not triangular but long, almost fusiform. The two portions of this muscle have their fixed insertion in common with the smaller portion of the great complexus, on the transverse processes of first two dorsal and articular tubercles of the cervical vertebræ. One portion has its fixed insertion on mastoid process of the temporal bone ; the others on the transverse process of the atlas. The small complexus is overlaid by the splenius and is related internally to the great complexus and the two oblique muscles. The fibres are parallel with the cervical cord. Its nourishment comes through the same arteries and it receives nerve force from the same cervical nerves as its larger fellow.

That portion of the superior cervical region, which is bounded above by the external occipital protuberance, below, by the superior spinous process of the axis, in front, by the inferior tubercle of the atlas and inferior spinous process of the axis, and behind by the cervical cord, is frequently interesting and profitable, but sometimes a very troublesome region to the veterinarian. Its anatomy calls for close study and frequent reviews if we would treat poll evil with the best success. Many stiff necks and enlarged polls are standing criticisms on somebody's poor surgery.

The *great oblique* muscle of the head is the short, strong muscle which rotates the head around the odontoid process of the axis. It is covered by the splenius and both conplexus muscles. Its inward relation is with the atlas, axis and atlo-axoid articulation. The fixed insertion is on one side of the superior spinous process of the axis. Its movable insertion is on the transverse process of the atlas. Blood supply is through the prevertebral, mastoid and retrograde branches of the occipital artery and small muscular branches of the vertebral. The second cervical nerve furnishes its main commotion with the great nerve centers. Its fibres run obliquely forward and outward.

Small oblique is a little, square muscle, aponeurotic in structure, lying over the occipito-styloid and digastricus

muscles. It is in relation outwardly with tendinous and aponeurotic portions of the small complexus, the splenius and mastoido-humeralis muscles. Its fibres run forward and upward. They originate on the transverse process of the atlas and terminate at the mastoid crest and on styloid process and external surface of the occipital bone. Its office is to produce a slight lateral flexion of the head on the atlas. This muscle has the same source of blood supply as the great oblique; but its nerve is the first cervical instead of second.

The small posterior straight is a little, triangular, flattened muscle which lies just over the occipito-atloid articulation. Its under surface covers the fibrous capsulo of this articulation. The outer surface related to the great posterior straight muscle, which is prismatic, and consists of two portions. It rests below on the preceding and relates to the great complexus and oblique muscles. Both straight muscles have their insertion on the occipital bone, behind the superior insertion of the great complexus. The larger has its origin on the superior spinous process of the axis and the smaller on the superior face of the atlas. Their fibres run forward and upward. Blood is supplied through the occipital and vertebral arteries. Nerves, first cervical and branch from deep cervical plexus. The duty of these muscles is to extend the head

The great and *small anterior straight* muscles, and the *lateral straight* muscle will be omitted to spare your patience; and the mastoido-humeralis briefly discussed, in conclusion, because of its functional importance and frequent involvement in poll evil cases. This muscle is composed of two portions, distinct in origin, but having a common insertion. The anterior, and most superficial portion, has its origin on the mastoid crest and process of the temporal bone. The posterior takes its origin from the transverse processes of first four cervical vertebræ and unites with the anterior in forming a cap over the scapulo-humeral articulation. The common tendon, or rather aponeurosis, inserts on the anterior border of the humeral furrow of torsion, just beneath the deltoid imprint. This muscle runs obliquely across the cervical

muscles downward and backward. The arterial supply, in the anterior cervical region, is through the occipital, and its main nerve is the spinal accessory. It is covered by the subcutaneous muscles, parotid gland and cervico-auricularis muscles. It, in turn, covers portions of the splenius, small complexus, both oblique, omo-hyoid, digastric, the great posterior straight, angularis, scalenius, small pectoral, both spinatus muscles, long abductor of the arm and coraco-radial.

The arterial supply of the entire cervical region comes mainly through the dorsals, superior cervicals, vertebrals and occipitals, first being collateral branches of the axillary arteries and the occipitals, terminal branches of the common carotids. The *dorsal* is given off opposite the second intercostal space, the *superior cervical* opposite the head of second rib, and the *vertebral* leaves the parent trunk nearly under the upper portion of the first intercostal space and passes forward *under* the transverse process of the seventh cervical and thence into the vertebral foramen of sixth cervical vertebræ.

The occipital leaves the common carotid trunk on a line drawn from the auricular base to the posterior portion of the larynx. From this point it passes forward, upward, backward and forward again, like a letter S, and goes under the transverse process of atlas, back to the guttural pouch, beneath the small lateral straight muscle, thence through the anterior foramen of the atlas, where its terminal division occurs. The dorsal and its larger branches may be readily located as follows: draw one line to the highest point of the withers from the head of first rib. Draw a second from the same point directly upward to the cervical cord. Intersect this second line midway and draw a third line two-thirds of the distance toward the base of ear.

The *superior cervical* may be located, for surgical purposes, by drawing a line from the head of first rib to highest point of withers (which point also locates the superior spinous processes of the fourth and fifth dorsal vertebræ). Intersect this line midway and draw another toward the auricular base, to a point opposite the third cervical vertebræ. Both

the dorsal and superior cervical arteries have their origin near the median line and constantly approach the surface. The vertebral is easily located and remembered, because after passing beneath the transverse process of seventh cervical vertebræ (which has no vertebral foramen) it simply follows the vertebral foramina of the next five cervical transverse processes, and anastomoses with the retrograde branch of the occipital. Its only importance in this connection lies in its superior and external branches to the muscles we have been studying.

The lymphatic vessels call for some attention in this discussion, because of the special part they play in distributing certain pyogenic bacteria, notably the streptococci. In external portions of the body, they are arranged in two primary sets, superficial and deep. The superficial again being divided into two networks, one of very fine meshes in superficial layer of the dermis; the other includes larger vessels and is placed quite beneath the skin. The ultimate origin of these vessels is still a matter of dispute, but all agree in tracing them back to lymphatic capillaries or rootlets, described by Klein as situated in epithelial tissue—Von Recklinghausen says in serous membrane. Even those observers who agree on connective tissue, disagree on other points, for Virchow says in plasmatic cells, while Ranvier says those cells are not cells at all, but radiating, connected spaces. Regardless of this ultimate-origin question, it is that delicate plexus in the superficial derma that interests us now, and which will be made use of in discussing modes of bacterial entrance. The larger and deeper lymphatic vessels are also divided into two classes, a superficial, ramifying in the tissues of the deeper aponeuroses, and a deep, following the larger veins, and lodged in the vasculo-nervous intermiscular sheaths. Every vessel traverses one or more lymphatic glands before emptying into the thoracic duct or right lymphatic vein. Those of the head, neck and front legs are all directed toward the prepectoral, at the chest entrance. Most of the large vessels in the region also pass through a smaller collection of glands, which lie beneath the mastoido-humeralis

and extend to insertion of the sterno-maxillaris. These are described by anatomists under the name of prescapular glands.

ETIOLOGY.—The next question is that of cause, and, like Darwin's first drop of protoplasm, some points are not easily explained. In discussing this subject under the four topics, origin—bacterial, sources from whence these microbes are received, mode of entrance, and factors which determine the location of the pre-fistular abscess, I wish to make, incidentally, the following points: That suppuration rarely or never occurs without the presence of pyogenic microbes or their products; that the initial abscess is usually the result of a local auto-infection; that fistulæ may be indirectly transmissible, due to any one or to a combination of several pyogenic microbes, and therefore not specific; that one attack gives no immunity, but predisposes to others; that external injuries may serve to fix their location but are not to be regarded as primary causes.

ORIGIN—*Bacterial.*—In the early days of antisepsis, when healing without pus was first demonstrated possible, we received the old dictum—"No micro-organism—no pus." Since those days, this question has been argued back and forth by Ogston, Fehleisen, Zuckerman, Nathan, Watson Cheyne and De Bary, who uphold it, and Grawitz, Councilman, Uskoff, Rosenbach, Orthman and Janowski, who oppose it. Dr. Senn, in his surgical bacteriology, concludes that pus microbes are the essential causes of suppuration; while Fraenkel, in his text-book on bacteriology, concludes that the weight of evidence is on the other side. Some admit that suppuration may occasionally be produced by deep injections of germ-free irritants like silver nitrate, ammonia, turpentine or cadaverine; but I think the great majority of competent observers hold that the great and common cause is the presence and activity of pyogenic micro-organisms in susceptible tissues, and that certain of these organisms may be regarded as specific exciters of suppurative tissue changes.

Ogston, as early as 1881, patiently examined the contents of sixty-nine abscesses for micro-organisms and found

streptococci in seventeen, staphylococci in thirty-one; both in sixteen. He also noted that the former followed the lymphatic channels and produced diffuse and extensive suppurations, while the staphylococci produced and appeared more commonly in distinct abscesses. Rosenbach carried his work farther, with better facilities, classifying and naming pyogenic microbes and adding to the list. Zuckerman tabulated 495 abscesses, showing that 71 per cent. contained staphylococcus, 16 per cent. contained streptococcus, both were found in 5.5 per cent. and the other pyogenic microbes rarely. Tricomi, in 1888, reported an examination of eighty abscesses, five phlegmonous inflammations and five furuncles, and found in all, one or several of the recognized pyogenic microbes. A vast amount of statistics have been published which prove beyond question that under natural conditions certain micro-organisms are always associated with the origin of pus. And it is equally plain from every-day observation, that bruises or external irritants of any kind do not alone produce abscesses. True, Fehleisen, Grawitz, Scheuerlen and other investigators have produced a limited suppuration by injections of ptomaines; but this is no argument against a theory of bacterial origin.

Finally, fistulæ frequently appear in an endemic form. I have had five cases on the same pasture that developed rapidly and in close succession; in every ease there was present decided elevation of temperature, loss of appetite, thirst and rapid loss of flesh. Twenty-one veterinarians of my acquaintance have written me in response to inquiry, that they have each seen three or more cases develop under similar conditions in rapid succession on the same farm.

INFECTION—*Sources.*—It is not difficult to enumerate sources from which infection may be received, but it is frequently impossible to prove a specific origin in an individual case. Pyogenic bacteria have a wide diffusion in nature, for they have been demonstrated in air, soil, water and a variety of foods. There is the old question of hereditary transmission with the still unsettled points: transmitted tissue susceptibility, or transmitted living germs, and the latter seems to be gaining

ground, with plenty of clinical evidence in its favor. Lebedeff reports a case where he found streptococci in various tissues of a child prematurely born of a mother who recently had erysipelas. Sangalli reported the finding of bacillus anthracis in the blood of a fœtus whose mother had died of carbuncle. Ahlfeld and Marchand, together, reported two autopsies, which showed that a child had died four days after birth from anthrax, and the mother died eight hours after delivery from the same cause. Netter, Bollinger, Strauss, Koubassoff and Levy have presented similar cases of pathogenic germs acquired in utero. Johne, in 1890, published a calf case more interesting to Iowa veterinarians than our celebrated Jones county calf case, to Iowa lawyers. In this case an eight months' fœtus was taken from the body of a tubercular cow. The fœtal lungs and liver both contained tubercles and bacilli of tuberculosis. Levy reports a case wherein the pneumonia diplococcus of Frankel and Weichselbaum played a similar part. In view of all this evidence, we can hardly doubt the possibility of actual germ inheritance, and especially since Nepveu has shown, in two cases, that pyogenic organisms may remain dormant or encysted for years, awaiting favorable conditions for development, and then cause profound disturbance. Gussenbauer, Rinne and Senn have all reported similar cases, which clearly prove that apparent pathological conditions do not necessarily follow, immediately, the introduction of those microbes, and which prove, also, that the absence of such conditions does not demonstrate an absence of pyogenic organism. To sum up this discussion of source, we can easily say that these troublesome micro-organisms are derived from the soil, air, food and maternal circulation.

MODES OF ENTRANCE.—That the actual transmission of living micro-organisms from mother to fœtus *in utero* is possible and probably frequent, has been fairly established by competent observers, whose notes and opinions have already been given.

Fraenkel, in explaining the sources of errors which may interfere with inoculation experiments, says:

"There are three ways in which micro-organisms usually penetrate into our bodies: First, from the surface of the skin, generally after it has been injured in some way. It does not, however, indeed always require such special door of entry (i. e., abrasion.) Second, the digestive canal into which the bacteria pass along with the food. Many, it is true, cannot pass through the stomach in their usual form, being destroyed by the action of its acid contents. Other kinds are less sensitive, and when spores are present, or when disease has altered the character of the digestive fluid and weakened its bacteria-killing power, there is no further obstacle to the passage of the parasites. Third, the respiratory organs can afford entrance to the bacteria."

Zuckerman, in summing up his experiments on suppuration, says plainly that pus-microbes can enter the body through the skin, intestinal mucous membrane or by way of the respiratory organs; but the most frequent entrance is through the skin. Longard, in discussing certain superficial abscesses, declares as his opinion that they are caused by pus microbes which gained access through the sweat glands, and gives as his reason for the latter proposition, that these certain microbes were found in abundance on the inner surface of the *membrana propria* of these glands, where they remained harmless till they penetrated to the underlying connective tissue; anyway, may not this be correct? This continuous lumen of the coiled tube, which constitutes a sweat gland, and the sudoriferous canal, which connects the gland with the body surface, is covered internally with a very thin, delicate membrane. This membrane is covered by two or three layers of polyhedral, epithelial cells, and over these lies the *membrana propria.* Now if those pyogenic microbes had reached the *membrana propria,* why may they not reach the underlying connective tissue of the corium, or even the subcutaneous tissues? Each gland has an afferent arteriole from which is formed a delicate plexus of capillaries, surrounding the gland tube. Thus are furnished the necessary conditions for receiving and distributing these pyogenic organisms.

Kraske has made a special study of acute osteomyelitis, and reached a positive conclusion that infection may take place through abrasions of the skin, through the respiratory organs or intestinal mucous membrane, but most commonly through the abraded skin. In one case he traces an acute attack to infection from a furuncle of the lip. Garre, Braunschweig, Schimmelbush, Roth and others have all demonstrated that healthy skin is not impenetrable to living microorganisms. The experiments of Buchner show positively that the respiratory organs may furnish an entrance to a variety of microscopic germs. There can be no doubt that abrasions of either the respiratory or intestinal mucous membranes, or of the skin, greatly facilitate their entrance, but it is equally certain that their entrance is possible and common when no such conditions are offered.

LOCATING FACTORS.—After discussing the bacterial origin, sources from which infection may be drawn and mode of entrance, there remains the query, what determines the location of the pre-fistular abscess? It has long been a matter of dispute whether pathogenic microbes exist in healthy animal tissues. I think the view is gaining general support that such conditions are possible, but that these same microbes do not exhibit their pathogenic properties so long as they remain in circulating blood and every body tissue remains healthy. Then to furnish the requisite conditions under which these pyogenic microbes may exhibit their pathogenic functions, some susceptible tissue must become injured or diseased. The blood or lymphatic fluid must be checked in its flow at that point, thromboses be formed, and the microbes be permitted to locate and multiply. In other words, to locate pre-fistular abscess there must be furnished a *locus minoris resistentiæ*, which Senn defines as being an area of lessened resistance due to a tissue injury, which so changes the tissue that pathogenic microbes previously present in the circulation become arrested, and find favorable conditions for multiplication. Huber asserts that several infectious diseases, as tubercular ostitis and arthritis, osteomyelitis and pyæmia may follow trauma in the absence of any possible local external infection.

His experiments on rabbits with anthrax bacilli are well worthy of study. He produced an inflammation of one ear by applying croton oil, leaving the other untouched. He then injected a pure culture of bacillus anthracis, and compared results on the two ears. His conclusions are that "the bacillus of anthrax finds in a soil prepared by an inflammation, induced by croton oil, a locus minoris resistentiæ, which presents more favorable conditions for its growth than tissues in other parts of the body." His conclusions may be summarized as follows: "Localization of pre-existing micro-organisms in tissues prepared by injury or disease takes place, provided that the necessary conditions for their growth are present."

But recent tissue lesions are not the only factors which may serve to produce such an area of lessened tissue resistance. The presence of old pathological products, exposure, feeble performance of any organic function, and a variety of general and illy-defined factors seem to produce conditions favorable to local infection. The regions which fistulæ usually select are such as are liable to receive blows and bruises, given by angry attendants, received in passing under low sheds and through low doors, or while rolling. Again, the soft tissues of these parts are mainly connective, and connective tissue areas are very prone to chronic suppurative processes and slow healing. Such then are the factors which serve to locate suppurative processes.

NEED OF CONTINUED RESEARCH IN THIS FIELD.—There yet remain many questions regarding the history and work of pyogenic microbes for bacteriologists and chemists to answer. We all wish to know to what depth beyond the surface of a pyogenic membrane do these pus-producing germs reach. Why does pus "burrow?" Is it by pressure and absorption? Is it due to a peptonizing activity of bacterial waste products, or is it due to some mysterious part played by the pyogenic microbes in their effect upon protoplasmic cell contents? We do not know so much as we would wish regarding the metastatic tendency of suppurative processes. Fistulæ sometimes heal rapidly and abscesses develop in the atlo-axoid region. There are some strange features in

such cases. Why do not domestic animals other than solipeds commonly develop fistulæ? Is it a question of tissue resistance, anatomical peculiarity, or a difference in histological elements? The chemist might give us a non-toxic, diffusible antiseptic, that will pass through the circulation and be excreted unchanged and capable all the while of destroying pathogenic microbes. There is a mysterious part played by certain portions of the lymphatic system that we could wish made plain. We do not even feel certain that we know why fistulæ occur more frequently in the superior cervical than in the gluteal or dorsal regions.

TREATMENT.—Many annoying features appear in the treatment of these cases which may be well understood and yet difficult to handle, for example, the well known tendency to recur after indefinite periods of apparent soundness—just such cases as a physician must deal with in a latent and local tuberculosis—which may ,under certain conditions—become suddenly general and active. Or, like the case reported by Gussenbauer, in which an apparently strong, healthy young man developed a case of lymphangitis and lymph-adenitis of left arm, followed by a circumscribed gangrene of skin and flexor tendons. Lymphatic glands did not suppurate but enlarged. After eight months of good health a large, acute abscess in left axilla, which convinced Gussenbauer that pyogenic organisms had remained in those glands latent for eight mon'hs. Nepveau reports two similar cases in which the latent periods were much longer.

Internal treatment, consisting of alteratives and tonics, may sometimes be used with advantage. Twenty-nine practitioners out of the forty-nine with whom I have corresponded on this subject advise more common use of such treatment. Generous food and tonics are always in order if patient is unthrifty.

The conditions which experience has taught me are necessary to successful treatment of fistulæ are briefly:

(*a*) Free escape of pus to carry out microbes and ptomaines.

(*b*) Destruction of the pyogenic membrane lining old sinuses and cavities.

(*c*) Destruction of accessible pyogenic microbes.

(*d*) Removal of foreign substances, as splinters of wood or necrosed bone.

(*e*) Establishment of an active granulating process.

The first I strive to attain at any cost. I accomplish such drainage by the knife, trocar and canula, setons of cloth or rubber drainage tubing and a surgeon's large pump. We sometimes need a seton that will remain in place for a long period and not decay. Horsehair, rubber tubing, shoemakers' linen thread or leather will answer this condition perfectly. I have never tried to trephine the scapula, but believe it can be done with advantage in those cases where a sinus runs down into the sub-scapular region; at least, I shall certainly try the operation when the first favorable case presents. In a few cases bottom drainage seems impossible. The only satisfactory substitute with me has been hydrogen peroxide. The next condition is secured by digestant solutions, by curette, or by severe, but self-limiting caustics, like pure carbolic acid, or concentrated alcoholic solution of bichloride; copper, zinc and the other metallic salts have not proven so satisfactory to me. Diluted nitric acid has given me good results, but my preference is ninety-five per cent. carbolic acid and the sharp uterine curette (human). Dilute bichloride, dilute carbolic and peroxide have proven the most practical antiseptics. The only way to get rid of foreign substances is by bold surgery. The production of active, healthy granulations sometimes calls for all the ingenuity a surgeon can muster. Turpentine, ammonia, common salt solutions and diluted white liniment have all given good results, but the practitioner must be cautions in using them. Long continued and repeated irrigations with hot dilute antiseptic solutions and even hot water, or hot and cold water quickly alternating in a steady current, will frequently transform a hopeless old chronic into a very interesting patient. A severe blister covering a large surface will sometimes bring about similar results, but is painful and frequently needless. I only use it in those cases where the discharge nearly ceases, but is annoyingly persistent.

Through the kindness of Iowa veterinarians, I have accurate reports on three hundred and fifty cases of *fistulous* withers, one hundred and thirty-three *poll-evils*, seventy-two cases where both appeared on same patient, and one hundred and three fistulous sores in other regions, and in addition the twenty cases of fistulous withers given under experimental work,

RESULTS AND TIME REQUIRED.—Of the 350 cases of *fistulous withers* 87.5 per cent. healed under various forms of treatment. The shortest time required 17 days, longest 126. Average of all cases reported 53 days.

Of the 133 cases *poll evil* 84.9 per cent. healed with similar treatment, average time required 42 days. Of the 72 cases where both appeared on same patient, 77.7 per cent. healed; I cannot give accurate figures on time required, but evidently it exceeded that of either *fistula* or *poll-evil*. Of the 103 cases of fistula sores in other regions, 92 per cent. healed rapidly. Those appeared as follows: Scrotal 6, mammary glands 5, ear 11, superior maxilla 8, inferior maxilla 7, rectal 6, dorsal region 9, mid-cervical 2, costal 9, brachial 2, tibial 3, patella 1, parotid 1, tarsal 2, flank 6, vagina 1, scapula 1, trachea 1, pectoral 8, Steno's duct 2, femoral 5, sacral 1.

The records of thirteen successive cases of fistulous withers, which occurred in my own practice during a certain period, and which were treated according to the general method given, show 92 per cent. cured, average period of treatment 46.5 days.

PROGNOSIS.—A study of these cases and the results reported for each shows plainly that the prognosis does not so much depend on the shape of head or style of withers, as frequently stated, as on the location of pre-fistular abscess and subsequent sinuses.

Next in importance is the physical condition of patient.

EXPERIMENTAL TREATMENT.—My own work during the past year has been such that I could not personally carry any continued series of experiments, so I had recourse to friends interested in the same work, who tried for me a certain line of treatment and reported results. I have no copy of the letter sent them, but taken from memory it was in general as

follows: The separate items used in the order given, once daily; abundant bottom drainage, irrigate thoroughly with 3 per cent. carbolic acid, or 1-1500 bichloride, rinse out the sinuses with pure water, plug the inferior opening and fill sinuses with a warm aqueous solution of hydrochloric acid 2 per cent., and any reliable scale pepsin (e.g. Dike's or Fairchild's), 10 per cent., leave undisturbed three hours, remove plug and irrigate again with antiseptic solution, to be continued as seems necessary to secure the desired condition.

I have records of 20 cases so treated. These show 19 or 25 per cent. cured, in an average of 36.2 days. The details must, of course, be varied to suit individual cases, and even for differing stages in the same case. Larger experience may teach that less pepsin is necessary, and that more or less of the acid will be more satisfactory.

Those who have tried this method agree that results are more rapid and satisfactory than with the older lines of treatment. There seem to be two objections: First, expensiveness; second, patient must be under the immediate care of operator. The last can have but little weight because that is where every case of fistula should be.

CASES.—I have full notes on the history and treatment of thirteen cases with criticisms on my own work, which I had hoped to present, but this paper has already reached such length that I will give only a few of the most interesting and difficult.

CASE A.—Bay horse, ten years old, eleven hundred pounds and thin in flesh; had been treated for five years by empirics and considered hopeless. An examination April 5th, 1889, developed four sinuses with common outlet located as follows: the first sinus was four inches deep, with an outlet two inches anterior to the cervical angles of the scapulæ at the median line. Probe passed straight down between lamellar portion of cervical ligament on one side and rhomboideus, angularis, great and small complexus muscles on the other. The second was located between the same structures; but had its direction backward and downward to anterior border of scapula—two and one-half inches long. The third sinus,

five inches long, extended from the common outlet, downward, forward and to the right, passing through the complexus magnus and splenius, and terminated between the cervical trapezius. Fourth, ten inches long, extended from the outlet, downward, forward and toward the left and terminated beneath the cuticularis colli. The treatment of this case was quite simple. Sinuses 3 and 4 were given inferior drainage by very large incisions at the lowest point. Sinuses 1 and 2 were drained by large setons passed from similar points to the surface in a downward direction. These sinuses were washed out daily with 1-3000 bichloride solution. The setons were left in place two weeks and daily moved up and down. Each week the patient was brought to town for examination and treatment. The treatment usually consisted of a thorough flushing with cold water, after which each sinus received a small injection of a mild, white ligament. August 10th an examination showed a sound horse, and there has been no recurrence during the three and a half years. The outlet and both drainage incisions were reopened by the knife every two or three weeks. Criticism: (*a*) Later experience has taught me that quicker results would have been obtained with less washing and irrigation. (*b*) The setons should have been left in place at least a month. (*c*) I should have insisted in having the horse under daily observation.

Case D, iron gray filly, two years old, never had a collar on, sheds and doors all high, running in a woodland pasture with case C. Examination August 20th, 1890, showed merely a large hygroma on left side, two inches in front of cervical angle or scapula. Contents thin, serum-like fluid without offensive odor; free incisions were made above and below; the cavity cleansed and packed with bichloride cotton. Somewhere at this point I made an error, for the case was on hand uncured all fall and winter. There was either an early-developed and undiscovered sinus down beside the cervical lamina, or a piece of cotton was left in the large cavity. In this case I expected a rapid recovery, and gave very little treatment during the fall; was away from my practice all winter, and on my return in April found case D had developed into

an old chronic, and was discharging freely from several openings. One sinus passed straight down beside the laminar portion of cervical ligament five inches and just in front of the anterior scapular borders. There were several short and superficial sinuses which I could lay open from top to bottom, but that deep sinus was a puzzle, owing to its peculiar location. The treatment decided upon was a long seton of rubber drainage tubing passed from the outlet diagonally downward, forward, and to the right a distance through and between muscles of fourteen inches. The shallow sinuses closed in twelve days. The long sinus and drainage tube were flushed out occasionally with mild antiseptic solutions. The tube was drawn down and clipped off an inch every other day. This process was required about five weeks and gave good results, for the sinus closed above as the tube was withdrawn. Notes show case D to have been dismissed June 1st, 1891. September 23d a small abscess was formed on right side near the cervical and near the old outlet, which soon ruptured. The opening was slightly enlarged, and the cavity with its short sinus was filled with ninety-five per cent. carbolic acid. There was profuse discharge for a week, then rapid and permanent healing. October 15th D was sound again, and has so remained ever since. Here was a case of dormant pyogenic microbes becoming active after a *locus minoris resistentiæ* had been formed, perhaps by bruise or other tissue injury. Criticisms:

(*a*) A lesson-teaching incident occurred when the drainage tube had been partly removed. A sudden swelling and stiffness of the front leg on that side occurred when the drainage tube had been partly removed, evidently a septic inflammation. Vigorous examination by the probe discovered, and opened a large pus cavity at one side of the artificial sinus. My only explanation is that the broad-bladed seton needle passed through the body of the small complexus parallel with the muscle fibres, and when the seton was drawn below they closed and healed rapidly, confining pus above.

(*b*) I made a very grave mistake in opening the cyst as long as there was a possibility of securing absorption.

(*c*) I should have made a more careful internal examination of the abscess in the first place and taken nothing for granted. I should also have removed the cotton personally.

(*d*) We make a mistake always when attempting to treat a fistula at long range.

Cases E and F were fully as interesting and difficult. My notes show B and G to have been very easy and rapidly successful. The next five cases appear among horses in the same pasture, all but one of which had poll-evil or fistula, and some both, during one spring and the early summer. I was first called July 1st, 1891. The history of this outbreak is rather meager. I was only able to learn that case I was a brown mare, seven years old, previously in good health and flesh, exhibited a decided swelling over the atlo-axoid region about March 20th, 1890. This swelling subsided before March, 1891. Another swelling developed rapidly, soon ruptured and discharged very profusely over the pastures and feed boxes. Some lung difficulty, probably septic in origin, developed, followed by a nasal discharge, and the patient died in June of the same year. Other cases followed rapidly.

Case J, gray mare, 1400½, six years old, very fat at first, exhibited a double poll-evil aad a fistula on right side of withers, lost flesh very rapidly, and on my arrival was found to be very thin, weak and stiff.

Case K, dark gray mare, five years old, 1100⅝, also in good flesh at first. A double poll-evil began to develop June 16th, 1891; very large at the time of examination, condition fair. Appetite poor in all these cases, and all showed 1.5 to 2.5° elevations of temperature.

Case L, dark gray, three years, 1200⅝ began, to swell on both sides of withers June 29th, 1891; in good flesh January 1st, appetite good and no discharge.

Sodium sulphite was alternated with arsenic, one dose of each daily. In none of these cases was the local treatment difficult to manage, and consisted of self-drainage by free incisions and a limited amount of antiseptic flushing by syringe with weekly stimulations. All recovered except I, which had died in June.

NOTES.—Cases C and D were two unbroken colts in the same pasture. C developed and discharged two months before anything wrong was noticed with D. These colts did not even have access to a shed. The cases I, J, K and L had access only to a first-class barn and shed, with wide, high doors. Nothing of interest could be discovered in the pasture except an artificial pond, which contained stagnant water, and out of which the horses must have drank, for there was no other water accessible. It seems plain to me that such suppurative processes may be indirectly transmissible and more than local in effect.

A proposition which Chauveau, Orth, Rosenbach and Wyssokowitsch have proven correct regarding source, locating factors and results of pus microbes in other conditions, and which Huber proved true for bacillus anthracis, and which Volkman, Schueller, Szuman and Verchere have proven for tuberculosis is certainly worthy of consideration as applied to the pathological condition under discussion.

Finally, I wish to express my indebtedness to the printed works of Chauveau, Crookshank, Frankel, Vaughn, Steinberg, to the veterinarians of Iowa who aided me by accurate reports, and especially to Drs. Edwards, of Iowa City, Hammond, LeMars, Williams, of Manning, and Derwent, of Marshalltown, who conducted the pepsin experiments.

PUNCTURED WOUNDS OF THE FOOT.

BY DR. J. H. TIMBERMAN.

(A Paper read before the Pennsylvania State Veterinary Medical Association.)

The subject of punctured wounds of the foot is one which, in some of its aspects at least, has at times caused me no little anxious thought, and while I have no doubt it is receiving all the attention from each one of you gentlemen which its merits or demands require, I venture to hope that I may succeed in impregnating a few remarks on this subject with sufficient interest to atone somewhat for the use of a little of the valuable time of this meeting.

You will agree with me, no doubt, that the very nature of the construction of the horse's foot, the delicate and vascular structure of the tissues entering into the formation of the soft parts thereof, confined as they are within the horny, box-like hoof, is a condition of things which renders wounds of this organ more or less troublesome, always calling for special treatment, differing somewhat, in its practical application at least, from that employed in the treatment of wounds of any other part of the body. Let a nail or any other sufficiently hard and pointed substance penetrate through the sole or frog, and though it may have only slightly punctured the sensitive parts, it has caused a wound of those structures which nature must go about repairing according to the same laws which operate in the healing of wounds in any other part of the body. The nail or other substance has, when it is withdrawn, affected the horn of the horse's foot very much in the same manner as a needle would if made to penetrate a cork, it has left little if any opening in the horn; the wound in the sensitive tissues has caused the escape of more or less blood or serum from their proper channels, which now lies as so much foreign matter in the part, and for which there is no channel of escape. If the quantity of blood or serosity is too great to be absorbed, suppuration must inevitably follow. The foot not being opened from below, nature in her efforts to get rid of the little blood, together with the products of the inflammation which these efforts have cost her, by her laws from which she cannot deviate, works the destruction of more and more tissue until she finds a place above the horn where the diminished density of the structure will facilitate breaking through. Sometimes, owing no doubt to the location of the puncture, these efforts of nature have caused so much destruction of tissue as to cause the hoof to drop off, to say nothing of septicæmia, etc., which sometimes results from mismanagement of the cases. By the use of the term mismanagement I do not mean to reflect on the treatment or management of these cases by any member of this profession, especially any of the gentlemen present, for we find too often that all the mismanagement necessary to work the destruc

tion of the animal has taken place before we were called. We frequently find cases in which we are told that the animal picked up a nail a few days ago, it was pulled out and turpentine put in, and he did not go a bit lame till this morning, when he was found so lame that he couldn't put his foot to the floor. On examination we will find that for a considerable space in the vicinity of the wound the sole or frog will be underrun with serosity or pus, sometimes the whole of one side, or the frog being separated from the sensitive frog. I make it a rule in these cases to remove all or most of the sole or frog which is separated from the sensitive parts, especially when the seat of puncture, which is more often the case than otherwise, is in one of the commissures of the frog, not forgetting that any commissure or concavity on the plantar surface of the foot is a convexity or sharp eminence within, and the pus in seeking a depending opening will gravitate from such points down toward the toe, causing more and more destruction of tissue; therefore in opening a foot I do not hesitate to remove all the separated horn, especially if the puncture is anywhere along the side of the frog or in any of the commissures, when it is imperatively necessary that this should be done, as a small opening around the puncture will not allow the escape of the pus which has already found a resting place nearer the ground.

Free opening as early in the case as possible, which means the removal of all the separated horn, followed by sufficient poulticing to cleanse the parts properly, and this by proper antiseptic treatment, insures success in these cases. But what shall we say of those cases in which the puncturing substance has gone directly into the vicinity of the navicular articulation?

I once made a post mortem in a case where something in the shape of a boiler rivet with a medium sharp point had caused fracture of the navicular bone. I have also seen a few cases of puncture of the navicular bursa or sheath. As a matter of course these are grave cases, and they may or may not be complicated with suppuration and underrunning of the sole, though this is entirely lost sight of in the gravity of the main trouble.

The separated portions of the horn are as a matter of course to be removed as in the other cases, but the treatment, such as poulticing, etc., will not suffice in these cases. The treatment which I have adopted in these cases has resulted in a fair share of success. I will endeavor to cite as well as I can from memory a case of this kind which I treated about four years ago. I was called on a Sunday morning to see a very fine road or driving mare belonging to Mr. P., of Wilkesbarre, which had on a drive the day before from Wilkesbarre to Newport, a distance of fifteen miles, gone lame when she had traveled about half the distance; they drove her the remaining half of the journey, and when they arrived at the colliery, which was their destination, the stableboy pulled a nail out of the foot; they drove her home, though she must have been very lame, but if I remember right they told me that she did not seem so dreadfully lame after they got her started, which may have been more or less tone, as she was quite a spirited mare. Suffice it to say that I found her very lame, sweating at every pore, grunting and manifesting every sign of extreme pain. I cannot now give the pulse and temperature readings, as I did not take notes in the case. My impression is that they corresponded with the other features of the case. On examination I found that though it had been but eighteen hours since she had picked up the nail, there was already considerable suppuration or underrunning of the horn in the vicinity of the puncture. On opening the foot (and by the way the nail had penetrated the foot about half an inch back from the point of the frog), I found that I had a discharge of synovial fluid; I removed all the separated horn, and had a poultice of flaxseed meal put on, thinking it well to treat for a time as an ordinary case. The following day, however, I had a sponge cut to the size and shape of the bottom of the foot, placing another crescent-shaped piece around the back of the heel, the whole saturated with a solution of zinc chloride, twenty grains to the pint, and a light bandage applied to keep sponges in place. I might mention that this is a favorite treatment of mine for synovitis at any part, the sponge saturated with

zinc chloride solution of this strength, and lightly applied to the parts, the solution causing coagulation, and by being careful not to remove the clot, we are often successful in checking the flow of synovia. The mare was quite a pet, and took the best of care of herself, rendering a sling, which I consider a necessary evil, not a necessity in this case. She was placed in a roomy box-stall, where she would lie down most of the time; the box being well bedded she did not get in the least sore, she never got the dressing displaced, and would allow dressing to be changed without offering to rise, all of which rendered the case more favorable than it would otherwise have been. I never got any further suppuration after having opened the foot thoroughly, and as near as I can remember, the discharge was stopped in about ten days; the animal was put to work in about nine weeks from the time of the injury, having continued lame for some time after parts appeared to be healed, which a few blisters seemed to relieve. Some time after this, perhaps two years ago, I had a similar case, synovitis, setting in a few days after the injury when the case had for a time seemed to be progressing favorably, lameness subsiding, suppuration checked, etc.; applied the same treatment, though it was necessary to use a sling in this case, the animal being quite restless even with the sling, still I managed to keep the dressings from becoming displaced; success was not so marked in this case; the synovial stopped, however, about as soon as one could expect. I think I had anchylosis in this case, the animal remaining quite lame for some time, though he eventually became fit for slow work, being a draft horse. I had quite a number of these cases which I treated in this way with more or less success, and in my practice I have never had septicæmia, or a case where a hoof sloughed off from a punctured wound of the foot, though I remember one in which I removed the entire sole and frog and in which two-thirds of the wall was loose. I think a free opening in these cases, allowing no loose horn to remain, especially in a location where it will allow pus to be retained, robs ordinary cases of their terrors. I suppose, gentlemen, it is unnecessary for me

to state that the chloride of zinc treatment is not original with me, but is mentioned in Morton's work on Veterinary Pharmacy. I have used it for years, however, and believe that when thoroughly and faithfully applied, it is the most rational and effective treatment we have for open joints.

EMPLOYMENT OF FORCE IN DYSTOCIA.

By Dr. W. H. Ridge.

A Paper read before the Pennsylvania State Veterinary Medical Association.

Force may be divided into two kinds—*internal* and *external.* The internal being due to the contractions of muscular tissue of the parent, while the external force is developed by mechanical aids.

There are varied opinions in regard to the amount and kind of force to be used, some using extreme force, as hitching a horse to the fœtus and tearing it away, while others use only one or two men at most, to pull on the fœtus. We will first study internal force; this we know is due to the contractions of the muscular fibers of the uterus, assisted by the additional and diaphragmatic muscles. We can increase this contraction of the muscular fibres of the uterus by oxytoxics—drugs which have the power of acting on the involuntary muscular fibres. And further than this, we have drugs that stimulate this contraction.

Alcohol and quinine have the power of increasing the force of the contractions. Ergot is mostly given as fluid extract. As dystocia is a difficult parturition, we must choose our force to overcome the difficulty. We all know that by giving ergot in a transverse presentation we would be making matters much worse, as ergot would add to the contractions, most likely producing tonic contractions so strong that we could never rectify the presentation, also giving the animal great pain, and, by the contractions being constant, would drive most of the blood from the uterus, which added to the pressure on the umbilical cord would kill the fœtus. The case in which ergot is indicated is inertia of the uterus,

the inertia being due to hydræmic innervation, produced by sickness or exhaustion. But a more safe plan would be to give quinine and stimulants until the fœtus has well dilated the cervix, and proved to be in the proper presentation and position.

I think it is very rare that ergot will be needed. Never when the dystocia is caused by a malposition. I use internal force so seldom that, so far as relieving the dystocia is concerned, I could well get along without ergot. The only safe time then to give it is when the head and front legs are delivered and the uterus seems to contract so feebly that we may expect a large amount of fluid to remain in the uterus. After the birth of the fœtus it is never desirable for the uterus to remain flabby and in a non-contractile state, as the fluid it contains is in contact with the air, and is the best of culture-mediums that one could desire.

Now I desire to call your attention to the action of quinine; in just such cases it stimulates the contraction of the uterus, not the tonic contraction of ergot, but increases the normal contractions, and acts very well in exhaustion, while you are not liable to produce those excessive after pains, that are most likely to end in eversion of the uterus.

Now the external force is what we are most interested in. As I have stated, we are divided in opinion in regard to the amount of force we can use with propriety, for if one *should* hitch a horse to a fœtus and tear it away from the mother (as I have cases cited to me) and the mother live, the case is reported for years as a favorable method. Not keeping a record of the cases where injury had been done, with probably only a fractional part of the force used, then how much force can we use? I will start with traction by the operator upon the cow and mare. With well directed traction, and the fœtus in proper presentation and position, traction by the operator will very rarely do injury, the traction of man being about the same force as the uterus. If I were asked how much force can be used, I would say never more than two men beside the operator, in the cow or mare, these pulling direct on the fœtus without the use of pulleys, etc. But

now you will say: oh! I can cite you a number of cases where more force than that had been used and with no bad results. Yes, and I can show more cases where two men have ruined the animal than favorable ones. And as for pulleys, etc., they are most decidedly dangerous to the mother, also cruel, unless used under an anæsthetic; and where the fœtus is of more value than the mother, or where the animal being a mare, the cæsarean operation is equally fatal.

Now you can see that I am not much of an advocate of force. I am more of an advocate of correct presentation and position. Gentlemen, you cannot place too much stress upon this one point. I have seen too many cases where several men have been pulling the poor animal around the stable for hours, when by repelling and rectifying a malposition, one man easily delivered the fœtus. Now this is the chief point with this paper: never pull on the fœtus until it is placed in proper position; this pulling on a fœtus before position is rectified, jams it into the pelvis, and this irritation producing spasms of the uterus throws it into tonic contractions, causing such a condition that an experienced obstetrician may be unable to relieve.

The means of attachment are made by the rope, hooks and forceps; make it a rule to cord all parts presenting before rectifying a malposition. I use cords about four feet long to attach to the fetlocks; there should be a loop at one end to make a slip-knot, one rope for the head halter (Binz) should be seven or eight feet long. I find that Binz's halter is the easiest to apply. The manner of pulling on the cord has a great deal to do with our success. Never have constant traction; pull by changing the direction of the traction, first upward toward the tail, then changing downward, the operator always guiding the parts of the fœtus. If the animal has been in labor some time, and the ammotic fluid has escaped, inject some bland fluid into the uterus, then lubricate the vagina with oil or lard before attempting to deliver the fœtus. Now, after rectifying all malpositions, you find that either the size of the fœtus, or deformity of the pelvis of the mother,

make our efforts fruitless, then perform embryotomy—rather than resort to undue violence at traction. I would say a few words in regard to the double volsella forceps; the trouble with those is the difficulty in opening them while in the uterus, and we should have a pair that could be separated, having a male and female blade. These would be very useful when the head and neck are turned back out of reach, we could then pass one blade under, the other blade over the neck, when we could in many cases draw the head in a position so that we could reach it by hand. These means of force should be studied closely, as a few pounds of traction at this time would rectify a malposition that all the traction on the legs we might choose to employ would be fruitless.

There is one force, a retrograde force, that we should study closely. I think the value of it is not known sufficiently, at least is not employed as much as it should be, that is the force of the repeller. Every practitioner should have one; the one I employ is three feet long, divided into three parts, having a handle on one end, and a cross-piece like a crutch (with a spear in the centre about one fourth of an inch long) on the other; this spear is to keep the repeller from slipping when pressed against the fœtus. The wound this spear makes is so trivial that I have never had any trouble from it. Of all the instruments I use, there is none so valuable in a dystocia as a repeller.

Three-fourths of our cases of dystocia are produced by some malposition of the fœtus and the easiest way to rectify this position is by pushing the fœtus into the abdominal cavity, so as to have room to turn or change it. If we repel by our hand, as soon as we take the pressure off the contraction of the uterus sends the fœtus back into the pelvis again, and ofttimes the pressure is so great that you are unable to change the position. Now is the time, after fruitless endeavors, you resort to extreme traction, when by the use of the repeller you could have an assistant pushing on it holding the fœtus back when you have room to change the position as desired.

I have frequently had two men pushing on the repeller while rectifying the position of the legs, with no accident.

There is danger of the repeller slipping off the fœtus and wounding the uterus, but the operator will have to guard against this.

The dangers in extreme force or badly managed force are several, as death of fœtus, laceration of the genital passages, contusions of the genital passages and injury to blood vessels, allowing the escape of blood in the subconnective tissue, injuries to the nerves, exhaustion, eversion of bladder, eversion of the uterus.

The study of these would make our paper too long. I will cite a few cases, cases that you all see frequently.

May 15th, was called at night, the owner saying that his cow had been in labor all day. He had called a man in the first stages who thought he knew all about such matters. After pulling for several hours making no headway, he gave an unfavorable prognosis. When I was called I found the fœtus in a posterior presentation, lumbo-sacral position, with hind limbs completely retained; the genital passages dry and greatly swollen, the calf emphysematous. The animal had been pulled around the stall by several men for a half a day, the cords being placed at patella. The cow was able to rise with help. I injected carbolized water, then applied lard to passages, the cow being in standing position. I now placed the repeller against the perineum of the fœtus, had two men push against it, pushing between the labor pains; by this means, with my guiding the repeller I was able to return it into the abdominal cavity, making it stand upon its head, when it was easy to rectify the malposition, and deliver, the fœtus being dead, the whole time not being over twenty minutes, without any pulling, except myself guiding the fœtus. The next day the animal was unable to rise, the genital canal being swollen greatly, discharging a fœtid fluid.

I washed out genital passages with pot. perm. col., gave internally

℞ Tr. aconite, ʒi,
Tr. belladonna, ʒii,
Cinchonæ sulph. ʒi,
Spt. nitr. 2sʒii.

M.—Sig.—Teaspoonful every hour.

The next day was trying to rise, but could not; same treatment.

May 18th.—Got up last night, does not eat, strains, back ached, muzzle dry, fæces becoming hard. Gave pot. nit. ʒi night and morning, also

℞ Ext. dig, fl. ʒss,
Cinchonæ sulph. ʒi,
Acid sulph. ʒii,
Spt. vini. rect.
Aqua fort. aa ʒii.

M.—Sig.—Two teaspoonfuls every two hours.

Made a good recovery.

Mare started in labor 5 A. M. Trainer soon saw that she was not progressing. Assisted her by pulling on the fœtus, soon delivering fore feet and head, when it stopped. He added more men pulling until eight men were pulling the mare around the box-stall, and in three hours had her completely exhausted. When I arrived she was unable to raise her head from the bedding. He had ropes to the head and feet. The mare was torn at lower commissure of vulva; it is needless to say the foal was dead. The trainer was having a hook placed in the wall behind the mare, and had triple blocks and ropes to tear it away. On making an examination I found the foal in anterior presentation, with a vertebro-sacral position, fore feet and head normal, but the hind feet had entered the pelvis beside the shoulder; of course all the pulling he could do would only tighten the wedge-shape mass. I cut the foal's body off close to vulva, leaving enough skin to cover the bones; using the repeller, returned the half of the body completely turning (performing version), when the mare gave birth to the foal in a posterior presentation, lumpo-pubic position, inside of five minutes, without any help beside myself.

This mare strained so hard after delivery that I gave ext. canabis indicus fl. ʒiii, bathed the vulva with hot water with creolin in it; mare suffered metritis for a month, then made good recovery.

Another case where the owner had several men pull a calf

away, the cow was unable to rise. I was called after the cow had been down two days; cow would not eat, continually moaned, and strained as in act of defecation; genital parts swollen. On opening the vagina, there were patches larger than one's hand where the mucous membrane was nearly an inch thick, and loosening, leaving a raw surface looking like a diphtheritic membrane. Injected a warm solution of permanganate of potass. Gave dig. cinchonæ, sulphuric acid mixture. This animal suffered much.

I could cite several cases where force had been used, the animal never rising after, the hind parts becoming completely paralyzed. Also numerous cases of eversion of uterus from this cause.

OSTEO-POROSIS.

By Dr. C. D. Morris.

Paper read before the New York State Veterinary Medical Association.

In the presentation of this subject, I bring before the gentlemen here assembled in this Society, in a manner not at all satisfactory, and I fear, as viewed by you at the conclusion, a lame discussion on a disease not very prevalent in this country to any extent in an aggravated form—and yet which I believe is prevalent to some extent in certain localities in a mild form, and when existing in a degree sufficient to warrant diagnosis, the baneful effects of the disease have made such inroads upon the animal economy as to baffle the skill and energy of the veterinarian to the extent that osteo-porosis is catalogued as one of the incurable diseases affecting the lower animals. However, I cannot believe it is a disease whose only sequel should be ultimate dissolution. The literature bearing on this disease is not abundant. In 1860 Prof. Varnell wrote an interesting article on osteo-porosis, and it is claimed that Varnell was the first to describe the disease. Later his article appeared in the *Veterinarian* of that year. About 1870 Sir James Baggett relates before the Pathological Society, London, his experience with a disease termed by

him as ostitus-deformans, and from the description he gives, stating symptoms, post mortem appearances, etc., I think there is no doubt as to its identity with the disease previously described by Varnell. Again, in Dr. Lippincott's report of 1875-76, Philadelphia, he relates the history of a disease under the head of ostities-deformans which bears a striking resemblance to that of osteo-porosis. Also Lane, in Grey's hospital report, Trans. of the Pathological Society, London, 1886, describes at length osteo-porosis, and I will here quote one paragraph from his very interesting and valuable paper in that report before discussing the disease from American pathology. Lane holds that the thickening of the skull is a process of repair, and not a direct result of the disease, and in mollities ossium the thickening of the skull is dependent upon an endosteal, and later upon a periosteal deposit of decalcified lamellæ of fibrous tissue, this being not a direct product of the condition, but an effort on the part of the organism to oppose and limit the baneful influences of the process of decalcification in so far as it affects the cranial vault. He applied the same argument to the analogous condition of the skull present in ostities-deformans, rickets, and congenital syphilis. What is osteo-porosis as understood on the American continent? It is a non-inflammatory disease of bone, characterized by defective action in one or more of the joints, affecting one or two of the limbs in an alternate manner, a much tucked-up condition of the abdomen, an arched spinal column, a straightening of the limbs, and, as the disease progresses, an enlargement of the facial and sub-maxillary bones, with defective mastication, accompanied with tenderness upon manipulating the bones of the face. During the entire stage of the disease the pulse remains about normal, with slight variation of temperature, obscure pains, metallic in character, resembling that of rheumatism.

I beg to give you a brief history of this disease as was manifest in these specimens before us. On the 14th of last February I was called to examine a two-year-old stallion suffering with lameness in the right fore extremity. Examination revealed tenderness and some degree of heat in the

heel. As this animal was being conditioned for fast work, I thought it not at all strange under the existing circumstances that he should bruise the heel, which seemed a valid cause for his lameness. I diagnosed the trouble navicular arthritis.

On the 10th of March I was called again; the lameness had then left the fore extremity, and at that time was very pronounced in the left hip. It was at this time that I began to mistrust the impending trouble, whereupon a thorough examinatlon was made which proved beyond doubt my suspicion. This case was watched daily from this time until May 25th, when it was deemed as only human to end the sufferings of the animal. During this period the disease presented the following symptoms: A constant degree of lameness in some one or more of the extremities at the same time, the pecularity of which was, when lame in two limbs at the same time, it would be that of the hind and fore limbs of the opposite side. The greatest degree of lameness existing was in the left hind leg, which became straight as the disease progressed, to such extent that a straight line drawn from the trochanter-major extremities to the os pedis would touch the entire length of all the long bones of the leg. A general atrophy of the muscles of the limbs, and at times an inability to rise without assistance; appetite, but toward the last there was a disinclination to masticate ordinary food, gruels being administered instead. The bowels remained normal throughout, urine natural in quantity and color.

Post mortem examination presented a most interesting revelation. I will relate a few of the most prominent lesions. The animal was bled for the purpose of dissection. The muscles of the legs were paler than natural, and maculate. In disarticulating the limbs from the trunk, and especially the bones of each limb one from the other, the interior of the joints presented a contrast. The articular cartilage was of a purplish hue, much thinner than natural and in some instances entirely lost, leaving the margin of the articulation at that point quite exposed. In others the articular cartilage was of natural thickness, but easily detached from the bone. In these the synovial fluid was darker in color and in some instances streaked with

blood. The synovial membrane was much thickened at the parts most vascular; then again these same structures in other joints were much paler than natural. The periosteal covering of the long bones was quite vascular and easily detached, especially the bones of the skull. Some of the flat and irregular bones were soft and could be readily cut with the knife. One very noticeable feature being that all ligamentous and tendinous attachments were easily separated, bringing portions of bone as they were torn loose.

These attachments were much discolored, indicating that local inflammation or extravasation of blood had taken place. I am of the opinion that there must have existed considerable inflammation in the soft structures affected, and was sufficient cause for the manifestations of lameness which existed in certain articulations. Another post-mortem characteristic is, that the weight of the bones is greatly diminished, apparently one-third their weight being lost. The increased size of the medullary canal is well marked in the long bones, and what seems to be a complete breaking down of the cancellated structure is visible throughout. The same degree of destruction exists in the compact tissue. The hauersion canals, the lacunæ and canaliculi appear as homogeneous.

Another noticeable feature of this disease presented itself while cleaning the bones—perhaps due to their extreme softness—the different processes (epiphyses) were detached from the bone. The application of the slightest force upon a tendon or ligament was sufficient to effect their removal. Contrasting a healthy bone with one affected with this disease, we observe that at the ends of the long and flat bones the disease has permeated the compact as well as the cancellated structure. The increased size of the hauersion canals is very patent, as is the formania for the passage of the blood-vessels. The same exists in the periosteal membrane, causing the bone at the extremities to assume a honeycombed appearance. Thus I might proceed at length to narrate post-mortem lesions, believing, however, that a few briefly stated facts will prove more interesting than a paper treating at length on all the details. From all sources obtainable in the literature

treating on osteo-porosis, and from limited experience, the causes and morbid development of the disease is still enshrouded in more or less mystery. However, I am forced to believe, from crude reasoning, that osteo-porosis consists in a degeneration of the normal developement of bone; the process being assisted primarily by decalcification, a gradual absorption of the calcareous materials, a diminution in the function to assimilate bone-producing foods, and latterly an unnatural development of the vascular and fibrous tissues of bone devoid of the true elements—osseous and cartilaginous structures. I base this reasoning on one fact, that osteo-porosis is a disease of development which occurs only during the growth of the animal, there being (so far as I can learn) no record of the disease in the adult animal. If osteo-porosis is a disease where incipiency originates in faulty digestion, which must necessarily entail a deranged absorbent system, thus attenuating the functional activity of assimilation, would it be unreasonable to suppose that the osseous structures ought to suffer quite as much as any other structure or vital organ of the economy? If food and oxygen are the source of all physical energies when properly appropriated in their relation to the maintenance of animal life in obedience to nature's laws, there is then but one expectancy.

It seems to me that therein lies the panacea to all physical ills. As I view the azure and crimson twilight in this, the evening of the nineteenth century, in the great work wrought by medical science preparatory to taking her place in the front rank at the dawn of the twentieth century as the science of sciences in its benefactions to animal existence, high or low, I cannot forbear the belief that within the next few decades, disease must succumb in the contest now waging as between the mysteries of insidious disease and the knowledge to which the medical science shall have attained. Then the declaration so oft repeated by the physician, which is but a warning to the timid and an acknowledgment of human weakness—"There now remains no further aid that man can afford"—this sentence shall then give place to one of broader, more intelligent, and more complete mastery over disease, "Go live in peace your allotted time."

REPORTS OF CASES.

"Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science."—VETERINARY RECORD.

A PECULIAR CASE OF POISONING—ONE OF THE THINGS DYNAMITE WILL DO.

By GEORGE N. KINNELL, M.R.C.V.S., Pittsfield, Massachusetts.

On the 26th of May, 1892, I was called to investigate the cause of death of a cow, this animal being the second that had died within a week, both having been members of the same herd and both having shown the same symptoms prior to death. The history in each case was that the animals became very dull and languid, suffered from profuse urination and thirst, gradually became comatose, and died in from twenty-four to thirty-six hours. The herd had been kept in a large pasture at one side of which there was an unfenced limestone quarry. The owner told me the cows were in the habit of spending a good deal of their time around this quarry. They liked to lick the fresh surface of the blasted stone, and also to pick up any sprinklings of blasting powder that might be spilt around.

I at once suspected the cows had got at a keg and helped themselves to their hearts' content, as the nitrate of potash, which constitutes seventy-five per cent. of the weight of blasting powder, would account for all the symptoms presented. On opening the cow I found the fourth stomach and first part of the small intestines very much inflamed, the inflammation being most acute in the stomach and becoming less so as it progressed into the intestines.

Throughout the stomach and intestines there was a quantity of black, slimy substance, such as can be got by mixing together mucus and powder, but there was not enough of it present to satisfy my mind that the cause of death was poisoning with blasting powder.

The kidneys were enlarged, flabby, friable, and almost in

a state of disintegration. The bladder was empty, thickened and contracted. On examining the contents of the rumen I found a piece of whitish substance about the size and shape of my thumb, which I at first thought was a piece of a root. On cutting it up, however, I found it to be a white, streaky, structureless substance, more like a piece of a wax candle than anything else.

Just then the foreman from the quarry came over to see what was going on, and the minute he saw what I was whittling yelled at me to stop. What I had been paring was the head of a dynamite cartridge. It need not be mentioned that it was at once very tenderly laid in the bottom of the grave which had been dug for the cow.

It seems that dynamite, when kept long, has a tendency to become hard and dry, in which condition it does not explode so effectually as when soft and moist. Consequently before using them the laborers set the cartridges out in the sun for a while, and it was in this way they came within reach of the cows.

The owner asked what he should do in the event of any more of his cows being taken with the same trouble. I told him the chief thing for him to do was to have the quarry fenced off, but that in such cases benefit could be had by giving large quantities of milk, eggs and flour gruel.

Next morning the owner turned out the cows as usual, thinking he could keep an eye on them, and herded them away from the quarry. But before he could realize what was taking place, a sly old cow had sneaked over to the ledge and right before his eyes picked up a fourteen-ounce dynamite cartridge, and although they chased her to try and take it from her she munched it as she ran and swallowed it all. They lost no time in getting to work, and for the next ten days the cow got milk galore and eggs without number. She, like the others, became quite sick and remained so for several weeks, but gradually improved and made a good recovery. I have never heard of dynamite being used as a medicine, and for that matter would hardly relish the idea of having it in my medicine case; but that it is at least a powerful diuretic

I have no longer any doubt, and from its composition this is nothing more than we might expect. The owner of the quarry compensated the farmer for his loss, and paid my bill as well. He also put a good, substantial fence around his quarry.

A CASE OF TETANUS.

By Wm. Rushworth, M.D.C., Monte Viste, Col.

The patient was a nine-year-old black coach stallion. I was called by the owner to see the same; he said he thought his horse was foundered. Found the animal standing in his stall, with all the symptoms of a case of tetanus, the head extended on the neck, the membrana nictitans passing over the eye on the slightest upward motion of the head, and the animal moved stiff and appeared uneasy. As far as the history of the case was concerned, I found by questioning the owner that some three weeks previous, the right fore-foot had been severely pricked in shoeing. Diagnosed the case as tetanus, brought on from punctured wound in the foot; prescribed an alœtic purge, and ordered the foot to be poulticed with linseed, the poultice to be made asceptic; also ordered the stall to be darkened and patient to be kept as quiet as possible. Next day found all the symptoms increased in severity, trismus partial, opisthotonos well marked. On making an examination of the foot, I found firmly imbedded in the cleft of the frog a wire nail at least three inches long; this was evidently the cause of the disease, and not the nail prick. I now prescribed fl. ex. gelsemium and pot. bromide aa. ℥ss., to be given in Oss. of milk, as an enema, three times a day. On the third day the symptoms appeared ameliorated, and continued the gelsemium and bromide treatment. On the fourth day trismus was complete, the least noise being sufficient to aggravate the muscular spasms to such an extent as to almost throw the animal down: the temperature, which up to this time had been only slightly elevated above normal, now commenced to rise, running up to 103 F.; peristaltic motion had ceased; the urine was

voided frequently, scant in quantity and of course high-colored.

On the fifth day, finding the gelsemium and bromide were beginning to affect the respiration, changed to antipyrin with hypodermics of morphia sulph. The use of the morphine, while it might seem contrary-indicated on account of its tendency to constipate, I find in these cases to be one of the best agents we possess to relieve pain. The patient being very weak, nourishment was now given by means of rectal medication—one quart of fresh milk, three eggs and half a pint of whiskey being given twice a day, mornings and evenings. On the sixth day some improvement was noticed, but I was not too sanguine, as tetanus frequently eases up, only to get a fresh grip, and attack the patient with greater severity; such was the case here, all the symptoms being aggravated on the following day. Up to this time the foot had been continuously poulticed. I now had this removed, bottomed out the wound, and used the sol. ex. belladonna freely, and then renewed the poultice; to move the bowels, I now gave an enema of glycerine, which had the desired effeet, causing a copious evacuation of fæces. The ninth day the patient appeared to improve, and the temperature had fallen to 101° F.; reduced the dose of antipyrin, which up to this time had been given in ʒi. doses every four hours, to ʒss. doses, t.i.d., and used injections of chloral hydrate in milk, at night. The patient from now on improved steadily, the jaws partially relaxed, and he was able to swallow a little water; sloppy bran mashes were now kept before him, and in the course of a week from the time that improvement set in the patient could swallow with ease. All rigidity of the facial muscles had disappeared, mastication was fully restored, although some difficulty in deglutition yet remained, which gradually disappeared. Ulceration of the cornea in both eyes followed as a sequel, which was successfully controlled by cauterization. In six weeks the animal had perfectly recovered. In tetanus with high fever, antipyrin seems to have the desired result in relaxing the spasms and reducing the temperature.

SUPERNUMERARY TEETH.

By T. B. Pote, D.V.S., Mt. Vernon, Indiana.

A mule about thirteen years of age was brought to me for examination, with the following history: had lost flesh steadily for several months; difficulty in masticating food, seemingly always hungry; was able to work, but easily tired. On making examination of mule my attention was first directed to the mouth with the following result: Four extra second molar teeth, one on the right side on the buccal surface of the alveolar ridge, and one on the lingual surface—the same condition being noted on the left side relatively to the second molar.

Advised extraction, which was done, and on examining the teeth they showed all the resemblance of the normal molar excepting that they were smaller. They showed no signs of being split and were beyond doubt supernumerary teeth. After removal of the teeth the mule rapidly gained flesh, and in a few days one would not recognize him as the same animal.

CONVULSIONS IN A DOG.

By S. Glasson, Jr., D.V.S., Peekskill, N. Y.

On July 13th, I was called to see a dog belonging to Mr. C——, of Brooklyn. The history of the case was as follows: The dog, a well bred Irish setter about five years of age, had had convulsions almost regularly every two weeks for about eighteen months, for which there was no apparent cause. No less than four veterinarians and a so-called dog specialist had examined the patient, and could do nothing to mitigate the poor brute's suffering. One veterinary surgeon had treated the dog for intestinal parasites, and the so-called specialist had pronounced it a case of chronic indigestion. All, however, had concurred in the opinion that the animal ought to be destroyed. The owner, who valued the dog at $500, refused to part with him, hence I was called to treat the case.

After examining the patient, and finding no apparent cause for the fits, I prescribed nitrate and iodide of kalium without

appreciable effect. I then concluded that the seat of trouble was located in the nervous system and administered nerve tonics, the result of which was the elapse of five weeks before another seizure of convulsions. The poor brute had twenty-six convulsions in two days, then went thirty-one days and was taken again, and during his fifteenth fit I terminated his sufferings.

A post-mortem examination revealed the intestinal tract to be nearly normal, the lower portion of both lungs slightly diseased and all the other vital organs apparently normal. In the right ventricle of the heart, however, I found an intricate mass of worms resembling strongyli filaria. The average length of these parasites was about six inches, and they numbered about twenty. Some of them had eaten into the tissue of the ventricle. Continuing my examination I found the ventricles of the brain softer than normal. Now there can be no doubt that this mass of parasites obstructed the venous circulation, and it is probable that this impediment to circulation caused the convulsions.

BIOLOGICAL REVIEW.

CONSIDERATIONS UPON THE FIRST PREMOLAR OF SOME DOMESTIC MAMMALIA. By H. LESBRE.

The first premolar in the dentition of mammalia is often absent, and when it exists it is always subject to caducity or to replacement. When it grows only once, it is by some considered as a tooth of the first, and by others that of the second dentition. The author considers the first premolar of solipeds, of swine and of dogs as a milk tooth which has acquired permanence, and not as a product of the second dentition which has changed from a milk tooth. He says:

"In solipeds the first premolar exists only on the upper jaw, and is only very exceptionally found in the lower; it is a more or less rudimentary tooth, which he has found in all subjects of the age, at least, of thirty months. It resembles the milk molar in its form by having a neck and by the date of its eruption, which takes place not later than two or three

months after the others, while it precedes by two years the growth of the permanent molars; and again, by its shelling off, which ordinarily occurs at the same time as the following tooth. It is rarely seen in the adult.

"In cattle and sheep, the same rudimentary tooth sometimes appears, almost always dropping with the three following molar teeth, and it is never replaced.

"In swine, the first premolar makes its appearance towards the fifth month, three or four months later than the second. Properly it is not a permanent tooth; it is very cadult and very aged animals have it, especially in the lower jaw.

"In dogs, the first premolar is also monophysar in both jaws, but cadult.

"In camelidæ, the first premolar, isolated from the other teeth and of canine shape, is also monophysar; but it is not a milk but an adult tooth; it appears only toward the sixth or seventh year when dentition is completed, and in the young there is in its place a slight tumefaction of the maxillary, followed by a small follicular cavity representing, no doubt, an indication of the milk tooth."—*Soc. of Biology.*

PHYSIOLOGICAL ACTION OF MORPHIA UPON BOVINES. By L. GUINARD.

Far from being a sedative and hypnotic for some of the animal species, it is, on the contrary, one of the most remarkable stimulants. In bovines, of whatever age and size, the author has never observed a stage of opium narcotism similar to that so easily produced in dogs. He has always seen the excitating drunkenness and the agitation, with hyper-excitability, follow each other in a length of time proportional to the doses. When it has had a quieting effect it has been only in nine or ten hours after the beginning of the experiment or even longer, and yet the quietness has had no resemblance to that ordinarily described as the sleep of opium.

In injecting small doses of chlorhydrate of morphia, only a slight excitation or a mere horripilation, with salivary and lacrymal hypersecretion is produced. If the dose is carried to five or six grammes these manifestations are exaggerated, and the animal dies during a crisis of convulsion.—*Ibid.*

ASCARIDES IN THE PANCREAS OF A PIG. By RAILLIET AND MOROT.

Pancreatic parasites have been only exceptionally mentioned either in man or in animals. Among these, echinococci are very rare in man as well as in ruminants; cysticercus cellulosæ have been found in men and in dogs; the sclerostoma equinum has been quite frequently found in the pancreas of horses; the ascaris lumbricoides has been found exceptionally in man. No observation has ever been recorded of the presence of ascarides in the pancreas of animals.

At a recent post-mortem made of a pig that had died with apoplexy an ascaris scilla was found in a dilated duct of the pancreas, into which it had evidently penetrated in passing through the canal of Wirsung.—*Ibid.*

MORPHOLOGICAL STUDY OF FAVUS. By CONSTANTIN AND SABRAZER.

The authors have studied the characters of favus in men, dogs and fowls. They have determined as to the presence of three favuses of three different species. That of man and the dog closely resemble each other, but are distinguished by the constant appearance of the cultures and by the invariable structure of the mycelium and its coloration. The favus of fowls is entirely different, forming a special kind.—*Ibid.*

MICROBIC ACTION OF DIGESTIVE SECRETIONS UPON THE BACILLUS OF KOCH—TRANSMISSION OF TUBERCULOSIS BY FÆCAL MATTERS. By CADEAC AND BOURNAY.

Does the normal gastric juice act and destroy the bacillus of tuberculosis? The experiments of Wesener, Miller, Bollinger and Hirschberger seem to confirm it affirmatively, while Strauss, Wurtz, Flack, Baumgarten, Fisher and Zagari have shown that the microbicide action of the gastric juice is very doubtful, at least concerning the bacillus of Koch. The experiments of the authors show its inefficacy and corroborate the opinion of the last experimenters. The results they have obtained authorize them to affirm that dogs and pigeons which eat tuberculous mixtures become centers of infection and true disseminators of the bacillus of Koch, most commonly through its lodgement in stables, barns and fields. These experiments prove the necessity of burying the tuberculous substances to prevent their being eaten by dogs.—*Ibid*

SOCIETY MEETINGS.

KEYSTONE VETERINARY MEDICAL ASSOCIATION.

The regular monthly meeting of the Keystone Veterinary Medical Association was held Nov. 16th, 1893.

The meeting was called to order by the President, Dr. R. G. Webster. There answered roll call Drs. Hoskins, Webster, Bridge, Lintz, Goentner, Hooker, Weber, J. R. Hart, W. L. Hart.

The minutes of the previous meeting were read and approved.

The application of Dr. W. L. Rhoads, Lansdowne, Pa., American Veterinary College, for membership was received and was referred to the trustees to be reported at the next meeting.

It was moved by Dr. Hoskins, and seconded, that the Board of Censors be authorized to look after the Prothonotary office to make the necessary changes and notify all those that have not registered to register.

Dr. Hoskins gave a very interesting report of the Veterinary Congress held in Chicago, for which the members present gave a vote of thanks.

The following were elected officers to serve for the coming year: President, Dr. Chas. P. Goentner, Vice-President, Dr. S. E. Weber, Secretary, Walter L. Hart, Treasurer, Dr. Francis Bridge.

The next meeting will be held at the office of Dr. Hoskins, 3452 Ludlow Street, second Tuesday in December, Dr. S. E. Weber, Essayist.

The meeting was then ajourned.

W. L. HART, *Secretary.*

INDIANA ASSOCIATION OF VETERINARY GRADUATES.

The following resolutions were passed at a semi-annual meeting of the Indiana Association of Veterinary Graduates, held at New Castle, Aug. 21-22, 1893.

WHEREAS, We have an institute situated in the city of

Indianapolis called the "Indiana Veterinary College," and the prospectus issued by said institute calling for three sessions of 13—"thirteen"—weeks each, and allowing an empiric to become qualified in one session at the aforesaid institute. Therefore be it

Resolved, We, as a body representing the Indiana Association of Veterinary Graduates, do denounce an institution called the Indiana Veterinary College, situated in the city of Indianapolis, State of Indiana, also graduates and honorary graduates of said Institute.

Resolved, We, as a body, humbly beseech your honorable body to give this due consideration, as we deem it an unfit institute for obtaining a veterinary education.

By order of Association.

J. E. CLOUD, D.V.S., *Secretary.*

GERMAN VETERINARY MEDICAL ASSOCIATION OF NEW YORK.

This Association, which was organized not long since, have held several meetings, at which interesting business relating to subjects pertaining to Americo German veterinary interests were considered. At one of these meetings a resolution was adopted in favor of publishing a monthly review under the name of "Zeitschrift fur Thierheilkunde and Vergleishende Medicin." Another important resolution was adopted, recommending the drafting of a bill by the members of the Society and other members of the profession in other States, which should embody the recommendation that the Government should pay an indemnity for every horse which should be destroyed on account of glanders and farcy.

The last meeting was held on the 31st of October, at Orange, N. J.

VIRGINIA VETERINARY MEDICAL ASSOCIATION.

The first meeting of this organization was held in Staunton, Va., on the 3d of October, 1893. The officers are J. A. Myers, D.V.S., President; C. K. Rhodes, V.S., V.D., Secretary.

NEW YORK STATE VETERINARY MEDICAL ASSOCIATION.

The fourth annual meeting of this Association will be held in the assembly rooms of the Vanderbilt House, Syracuse, on Tuesday and Wednesday, the 9th and 10th of January, 1894. The profession at large is invited.

VETERINARY MEDICAL ASSOCIATION OF NEW JERSEY.

The thirtieth regular meeting of the Veterinary Medical Association of New Jersey was held in Morristown on Thursday, December 14th, 1893.

Dr. J. Gerth, the President, being absent, the meeting was called to order by Dr. Drummond, of Woodbridge, N. J., second Vice-President. On call of the roll the following members answered to their names: Drs. W. B. E. Miller, J. W. Hawk, Jas C. Dustan, B. F. King, W. Runge, R. O. Hasbrouck, R. R. Letts, J. M. Everetts, M. M. Stage, A. W. Axford, H. Exton, B. L. Drummond, S. Lockwood, Ira Kilburn, Prof. Leonard Pearson. Delegates from Pennsylvania State Association, J. W. Stickler, M.D., A. V. Baldwin, M.D., G. Swain, M.D., and about twenty visitors—stockgrowers, dairymen and farmers, who were interested in the question of tuberculosis, which was of special order at this meeting.

The regular order of business was first gone over, and an interesting and instructive paper on "Influenza in the Horse" was read by Dr. Miller, of Camden. Prof. Pearson read an interesting paper on "Tuberculosis, and the Use of Tuberculine in Diagnosing the Disease." He gave a history of a number of experiments with the same; also of a number of experiments on pigs and rabbits. He also spoke of the dangers from tuberculosis and the necessity of both State and national legislation for this disease.

Dr. Stickler, of Orange, followed with some very interesting and instructive remarks on the disease, and gave an alarming report of the number of deaths from the disease in the last ten years in this State, averaging over three thousand each year; he also urged the necessity for better and more

effective legislation. Dr. Baldwin, of New Brunswick, followed with other pertinent remarks and figures; he also gave an interesting account of a number of experiments that he had seen and assisted in at the experimental station near New Brunswick; he also urged the necessity of proper legislation. Remarks were also made by Drs. Hawk, Miller, Dustan, Lockwood, Swain and others, all pertaining to the subject.

A characteristic specimen of the disease was presented before the Association by Dr. Hawk in a pair of lungs from a registered Jersey cow owned near Orange, N. J., which he had slaughtered a few days ago and which had been kept as a family cow. The lungs were a solid mass of tubercles throughout.

Dr. Stickler requested the Association to appoint a committee to confer with a committee from the State Medical Association and other associations for the purpose of formulating a bill to be presented to the next legislature, having for its object the eradication of the disease from the dairy herds known to be infected in various parts of the State, and to prevent the sale of milk from such herds.

The Association also adopted resolutions of condolence with the family of the Hon. J. M. Rusk, deceased, late Secretary of Agriculture, who was an honorary member of the Association.

Resolutions were also passed approving the action of the late International Veterinary Congress, held in Chicago, Ills., and of the resolutions adopted there relating to the spoils system in the veterinary appointments recently made by the Bureau of Animal Industry. A resolution was also passed disapproving the action of the officers of the National Veterinary College at Washington in making their course one of two years instead of a more lengthy one, believing it prejudicial to the best interests of veterinary science to graduate students after such a short course of study.

Dr. Dustan, Letts and Drummond were appointed essayists for the second Thursday in April, 1894. Some interesting cases were then reported by some of the members, and thanks were extended to the visitors and others for their attendance

and interesting remarks made; also to Mr. A. E. Voorhees for the use of his elegant parlors in which to hold the meeting, after which the meeting adjourned.

S. LOCKWOOD, *Secretary.*

OHIO STATE VETERINARY MEDICAL ASSOCIATION.

The annual meeting of the Ohio State Veterinary Medical Association will be held in Columbus, Ohio, on Tuesday and Wednesday, January 9th–10th. The election of officers for 1894 will be held, and arrangements have been made for a social banquet. All members are especially invited to meet with us, pay up their dues and have a good social time, besides listening to several good papers. All graduates residing in the State are eligible to membership.

WM. H. GRIBBLE, D.V.S., *Secretary.*

MASSACHUSETTS VETERINARY ASSOCIATION.

Me tings were held in January, February, March, April, May and June. According to the by-laws of this organization the regular meetings were held at No. 19 Roylston Place, Boston, with Dr. L. H. Howard, President, in the chair, with a good number of the members in attendance.

Among the most interesting subjects discussed at those various meetings, were a paper on "Punctured Wounds of the Foot," read by Dr. L. Ban; an interesting case of azoturia, by Dr. Parker, which was like other cases of this disease, with the exception that it came on without any noticeable exercise to induce it, the animal having been idle for a week, and falling down with azoturia while walking from the water trough to his stall. A very interesting paper on "Scouring in Calves," was read by Dr. Parker (which has been published in the REVIEW); also the report of a case of thrombosis of the external iliac. The clot in the artery was several inches long, and comparatively filled the lumen of the vessel,

and there were two parasitic aneurisms on the cœlic artery. The thrombus could not be felt, antemortem, per rectum, the plug being too low down, but the leg was cold and the horse was lame on it, and there was inflammation of the laminæ, separation between hair and hoof, periostitis of the os pedis, and caries of part of it. The animal had colicky pains at times, and at others would have attacks of dizziness, in which he would throw himself down and thrash around.

Dr. Bryden, in the June meeting, read an interesting paper on "Hoof Culture." (Already published).

JOHN M. PARKER, *Secretary.*

OBITUARY.

W. T. CARMODY, M.R.C.V.S.

Dr. William T. Carmody, M.R.C.V.S., died at his home, No. 65 West Thirty-seventh street, New York City, on Tuesday, Nov. 21st, from pneumonia, after a week's illness.

He had to examine all the horses entered at the recent horse show held in Madison Square Garden. He begun his task on Sunday, November 12, as the animals began to arrive and were put in their stalls in the Garden.

He worked at his task of examining the animals on Monday, Tuesday and Wednesday of the show week. On Tuesday he neglected to take proper care of himself, and he contracted a slight cold, which on Wednesday made him take to his bed.

Dr. Carmody was born in London, England, on December 7th, 1851. He was educated in the Douai College, Douai, France, and during the Franco-Prussian War, while still a student at college, served in the ambulance corps. After his graduation he returned to England and studied his profession in London, where he graduated.

SANITARY MEASURES.

INSTRUCTIONS TO LIVE-STOCK INSPECTORS.—The following supplementary regulations for the inspection of live-stock and their products have been issued by the United States Department of Agriculture to inspectors in charge of abattoirs under the regulations of the United States Department of Agriculture of March 25, 1891 :

You are hereby notified that beginning October 1st, 1893, the inspection of all hogs slaughtered at the abattoir which you are in charge of will be inaugurated.

This inspection will be carried on in accordance with the aforesaid regulations of March 25th, 1891, covered from rule 2 down to and including rule 12 of said regulations, and will be similar in all respects to the system now in operation applied to the inspection of cattle and sheep. It will include a careful ante-mortem examination of all hogs, as required by rule 6, and a subsequent post-mortem examination, as required by rule 7.

The carcasses of all hogs that are to enter into inter-State trade as dressed pork will be tagged in the same manner as cattle are now marked for identification. The products of hog carcasses which enter into inter-State trade will be stamped in the same manner as are the products of cattle.

No microscopic examination will be made of hogs slaughtered for inter-State trade, but this examination will be confined to those intended for the export trade and will be carried on as heretofore, and only at abattoirs which export pork products to countries requiring a certificate from this Government to secure the admission of such meats. Hereafter all inspectors issuing certificates for export of pork products which have been microscopically examined will enter upon the same the number of each stamp marking the packages for which said export certificate is issued.

All hogs found upon either ante-mortem or post-mortem examination to be diseased or for any reason unfit for human food will be condemned by the inspector in charge of the

abattoir, who will see that the carcasses of the same are tanked by the owners of the abattoir. In case the owners of the abattoir refuse to tank such carcasses then the inspector will tag said animals with tags for condemned meat, which will be furnished by this department.

Owners of abattoirs are warned against removing the tags so attached to condemned carcasses, and are notified that they will be prosecuted under section 4 of the Act of Congress of March 3d, 1891, for any such attempt to tamper with the device for marking condemned animals as prescribed by this regulation.

Accompanying and forming part of this order are directions to inspectors, designating the diseases and conditions which render animals unfit for human food, and for which they shall be condemned by the inspector.

J. STERLING MORTON, Secretary.

Dr. D. E. Salmon, Chief of the Bureau of Animal Industry, has issued the following to inspectors of the Bureau of Animal Industry in charge of the inspection of animals slaughtered at abattoirs throughout the United States:

Supplementary to the order of the Secretary of Agriculture of this date, directing the ante and post-mortem examination of all swine slaughtered at the abattoirs where the Department of Agriculture is carrying on inspection, the following instructions are issued as a guide to inspectors in the condemnation of cattle, sheep and swine and their carcasses.

All animals found on either ante or post-mortem examination to be affected as follows are to be condemned and the carcasses thereof stamped with the "condemnation" stamp supplied by the department, and inspectors will see that said carcasses are placed in the rendering tanks of the abattoirs: (1) Hog cholera. (2) Swine plague. (3) Charbon or anthrax. (4) Malignant epizootic catarrh. (5) Pyæmia and septicæmia. (6) Mange or scab in advanced stages. (7) Advanced stages of actinomycosis or lumpy jaw. (8) Inflammation of the lungs or of the intestines. (9) Texas fever. (10) Extensive

or generalized tuberculosis. (11) Animals in an advanced state of pregnancy or which have recently given birth to young. (12) Any disease or injury causing elevation of temperature or affecting the system of the animal to a degree which would make the flesh unfit for human food.

Any organ or part of a carcass which is badly bruised or affected by tuberculosis, actinomycosis, abscesses, suppurating sores, or tapeworm cysts should be condemned.—*Breeder's Gazette.*

SUNDRIES.

I.—HORSE VERY SICK.

"Name, oh doctor! name your fee!
Ask—I'll pay whate'er it be!
Skill like yours, I know, comes high,
Only do not let him die!
Get him out of this and I
The cash will pay you instantly.

II.—HORSE CONVALESCENT.

"Cut, oh doctor! cut that fee!
Cut, or not a dime from me!
I am not a millionaire,
But I'll do whatever's square;
Only make a bill that's fair,
And I'll settle presently.

III.—HORSE WELL.

"Book, oh doctor! book your fee!
Charge—I'll pay it futurely,
When the crops all by are laid,
When every other bill is paid,
(Or when of loss again afraid)
I'll pay it ——— grudgingly."

S. R. HOWARD, V.S., Hillsboro, Ohio.

THE CHICAGO PASTEUR INSTITUTE.—The director has issued a circular, dated Nov. 18th, giving the results of the preventive inoculations against hydrophobia practiced in this institution since its inauguration on July 2d, 1890. 302 persons have been treated, classified as follows: 104 bitten by animals recognized and ascertained to be rabid by the experimental proof made in the laboratory or by the death of other persons or of animals bitten by the same animal; 126 bitten by animals recognized to be rabid by the symptoms of the disease shown during life; 72 bitten by animals strongly suspected to be rabid; 282 bitten by dogs, 7 by horses, 7 by cats, 3 by skunks, 2 by wolves, and 1 by a mule. The persons treated came from the following States: 185 from Illinois, 32 from Iowa, 23 from Indiana, 21 from Kansas, 9 from Ohio, 5 from Missouri, 5 from Arizona, 4 from Minnesota, 4 from Michigan, 4 from Louisiana, 3 from Tennessee, 3 from Kentucky, 2 from Texas, 1 from Wisconsin and 1 from South Dakota. One death was reported among the patients treated, thus giving a mortality of only 0.33 per cent.—*N. Y. Med. Journal.*

RECOVERY FROM CHRONIC GLANDERS.—Holmes holds that glanders is rare in man, and that it presents itself in two forms—one acute and rapidly fatal, terminating, as a rule, within two or three months; the other chronic, from which the patient may recover after one, two, four or five years.

The author reports the following case: The patient, a well-developed man, aged twenty-two, had always been well and strong, and lived on a farm all his life. Two of the horses under his care died of glanders. Some time during the middle of December, 1889, a felon appeared on one of his fingers. There was no adenitis nor lymphangitis, and no rise of temperature nor chill. Before the felon was entirely healed five suppurating foci appeared on different parts of the body—one at the elbow, one at the vertex, one on the right side of the lower maxilla, one in the right thigh, and one in the right calf. These foci appeared three weeks after the beginning of the so-called felon. They each began with

a sharp, stinging pain, much like a bee-sting, with deep swelling and little or no œdema or redness. When the patient was first seen the temperature was 100° F. and the pulse 92. When the sores opened they presented somewhat the appearance of tubercular abscesses, but with this difference: the abscess wall was covered with a firm, hard, almost shot-like, bright-red granulation tissue, and the extending secretion was sanguinolent. Inoculation on guinea-pigs and rabbits proved the presence of glanders. The treatment of this case is most important, since it ended in recovery. The five abscesses were opened under ether, curetted, and swabbed out with a saturated solution of sulphate of zinc. They were then packed with iodoform gauze wet with a saturated solution of iodide of potassium. The wounds healed slowly. During the entire course of the disease the patient had fourteen foci of ulceration.—*Therapeutic Progress.*

VETERINARIAN WANTED.—We notice in your paper advertisements of veterinary surgeons. Please send us the name of some young, reliable man, that we can locate in our stable, and indorse. There is a good opening here and would like to locate one.

DURFEY & ASHER, Jackson, Mo.

FOR SALE.

A good paying practice in a city of 5,000 inhabitants, 300 miles west of Chicago. No other graduate in the county. Will sell practice, including new operating table, for $300. Address,

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